

# Cal-Adapt

## Linking Climate Science with Practitioner Need

Development Supported by the **California Energy Commission** and the **California Strategic Growth Council** with oversight and guidance from our **Technical Advisory Committees** (past and present)

Developed by UC Berkeley's **Geospatial Innovation Facility**



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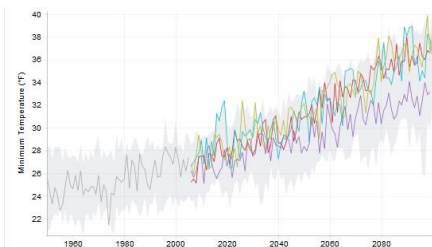
Cal-Adapt



# Cal-Adapt: Linking Climate Science with Practitioner Need

Cal-Adapt provides a scientific basis for exploring climate-related risks and resilience options for adaptation planning and adaptation.

- Convey local climate risks based on peer-reviewed science;
- Climate change projections presented in **easy-to-understand format** with plain English descriptions *and* scientific rigor;
- **Interactive maps and charts** provide a variety of approaches to explore different aspects of climate change;
- **Access to primary climate change data** for further analysis and research;
- Enable **development of custom tools** designed to manipulate climate change projections to support decision-making.













Cal-Adapt offers a variety of tools for exploring high-resolution projections of climate, including temperatures, precipitation, snowpack, sea level rise, and wildfire.

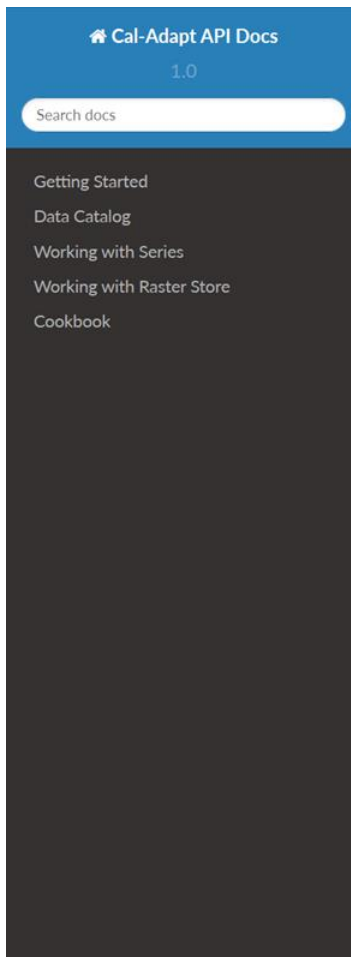


# Providing Scenarios Approved by State for Energy Sector Planning

- Recommended scenarios available via Cal-Adapt, which defaults to the four “priority” models chosen to represent a range of possible futures.
- These scenarios are the **basis for California’s Fourth Climate Change Assessment**.
- IOUs requested set of common standards, timeframes, and scenarios to rely on for planning.
- OPR’s forthcoming guidance to state agencies will rely on these scenarios, too.

CLIMATE MODELS			
	HadGEM2-ES*	<input checked="" type="checkbox"/> Show/Hide	Warm/Dry
	CNRM-CM5*	<input checked="" type="checkbox"/> Show/Hide	Cool/Wet
	CanESM2*	<input checked="" type="checkbox"/> Show/Hide	Average
	MIROC5*	<input checked="" type="checkbox"/> Show/Hide	Complement
	ACCESS1-0	<input type="checkbox"/> Show/Hide	
	CCSM4	<input type="checkbox"/> Show/Hide	
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	CMCC-CMS	<input type="checkbox"/> Show/Hide	
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# Cal-Adapt API

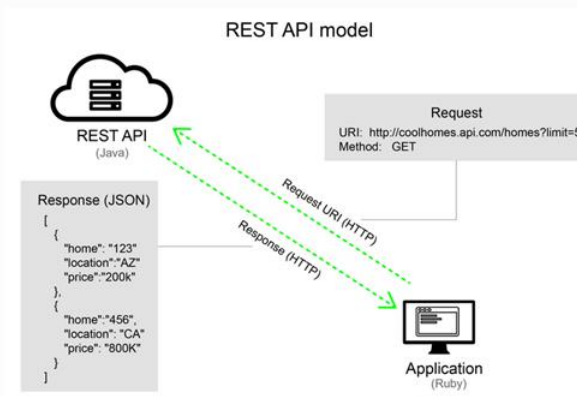


## Cal-Adapt API

Cal-Adapt API (Application Programming Interface) provides programmatic access to climate data hosted on Cal-Adapt. In general, an API is like a cog that allows two systems to interact with each other, e.g. a web browser on your computer and the Cal-Adapt server.

The Cal-Adapt API is built using [Django](#), [Django REST framework](#), and [Django-Spillway](#), an open source library developed at the GIF. The API follows an architectural style called REST (REpresentational State Transfer) which uses HTTP as the transport protocol for the message requests and responses.

## What is a REST API?



*A general model of a REST API ([source](#))*

The client (web browser, desktop GIS software, Python script, etc.) sends a request to the API server for data and the server sends a response back. The client and server can be based in any language, but HTTP is the protocol used to transport the message. This request-and-response

## Exploring California's Climate Change Research

Cal-Adapt provides a view of how climate change might affect California. Find tools, data, and resources to conduct research, develop adaptation plans and build applications.



Annual Averages  
Extreme Heat  
Cooling Degree Days



Annual Averages  
Heating Degree Days



Annual Averages



Snowpack



Sea Level Rise



Wildfire



Streamflow

## Climate Tools

Explore projected changes in temperature, precipitation, snowpack and sea level rise in California over this century with our interactive climate data visualizations.

EXPLORE

## Download Data

Download high resolution downscaled daily, annual and monthly climate projections for your project area in NetCDF or GeoTiff formats.

EXPLORE

## Find Resources

Search State of California's Research Catalog, explore peer-reviewed publications, understand how to use climate projections.

EXPLORE



# Cal-Adapt's Impact on Climate Adaptation Policy and Guidance in California

Cal-Adapt has already made a difference in adaptation and policy planning in California and has been explicitly recognized by California's legislature as a key recourse to support local hazard mitigation efforts:

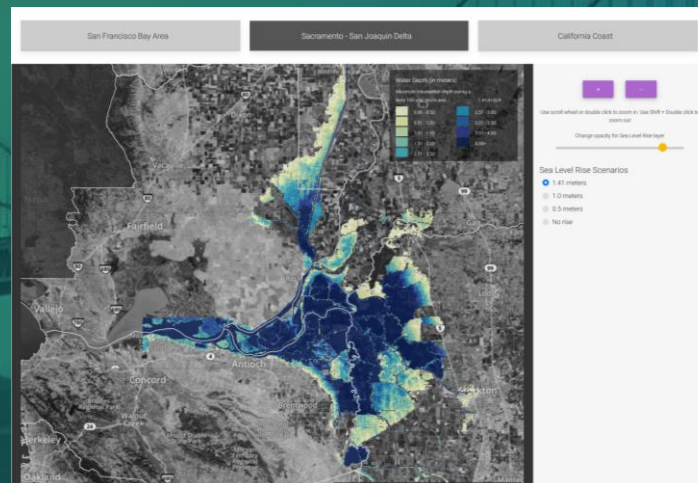
- Cal-Adapt is named as a resource by landmark legislation (SB 379) that requires the integration of climate-related risks into local hazard mitigation plans.
- General Planning Guidelines (2017 update) direct local governments to Cal-Adapt as resource to support assessment of climate -related vulnerabilities and development of adaptation policies.
- *Planning and Investing for a Resilient California* (January 2018) which provides adaptation guidance from the TAC established by OPR directs state agencies to Cal-Adapt as a source for peer- reviewed, state- sanctioned data depicting projected climate risks and for map overlays to facilitate planning and investment.
- In March 2017, the State Water Resources Control Board (SWRCB) approved a resolution (no. 2017- 0012) on "Comprehensive Response to Climate Change" directing staff to consult "the most current data available through Cal-Adapt."
- OPR's Adaptation Clearinghouse (the Integrated Climate Adaptation and Resiliency Program), development of which was mandated by SB 246, refers users to Cal-Adapt for exploration of local climate risks through high resolution climate projections.

# Next-Generation Cal-Adapt

- User needs assessment outreach
- Increase data accessibility
  - Local climate reports in easy-to-use format such as .pdf or spreadsheet
  - Build linkages to ICARP's Adaptation Clearinghouse and other state resources
- Develop visualization tools to explore multiple climate events
  - Potential areas of research:
    - Wind speed & relative humidity (Santa Ana winds)
    - Extreme precipitation & enhanced fire risk (mudslides and flash flooding)
- Develop new visualizations, features, and tools
  - Identify existing data gaps and acquire new data where possible
  - Allow users to explore projected climate impacts on populations and communities
- Engage stakeholders through collaboration and training
  - Domain specific training modules and webinars

# Enhanced Sea Level Rise Tool

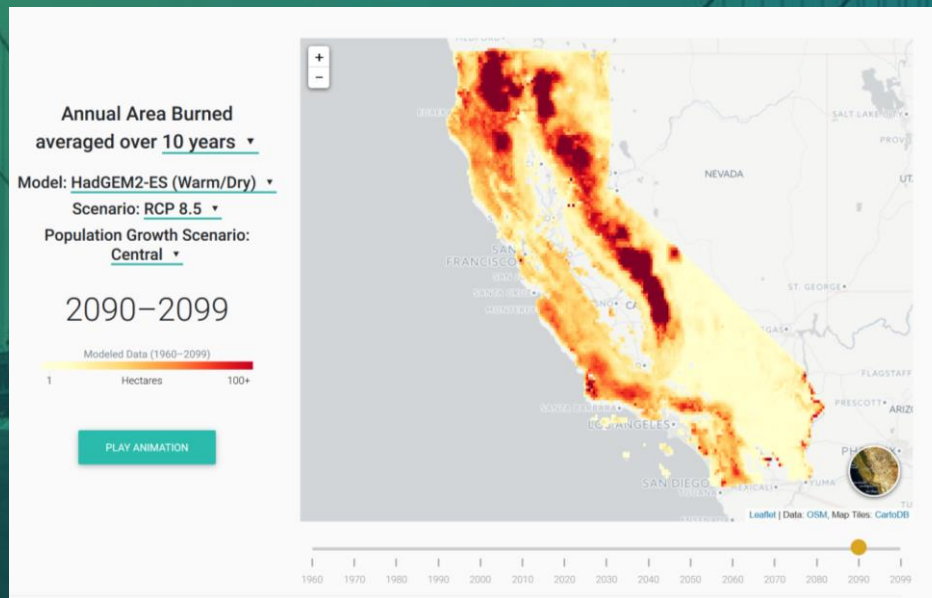
- Enhanced **Sea Level Rise** tool is in the planning stages
- Partnering with **Climate Central** to compute and visualize flood risk and to effectively communicate sea level rise science
- Designed to allow users to view multiple datasets portraying SLR impacts
- Additional datasets include:
  - CoSMoS (USGS Coastal Storm Modeling System)
  - Updated CalFloD-3D (Radke)



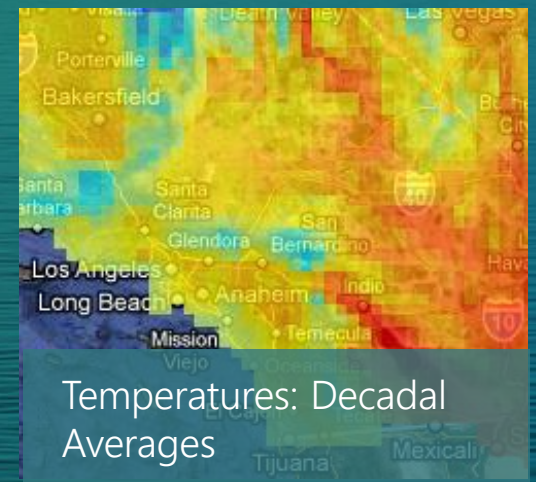
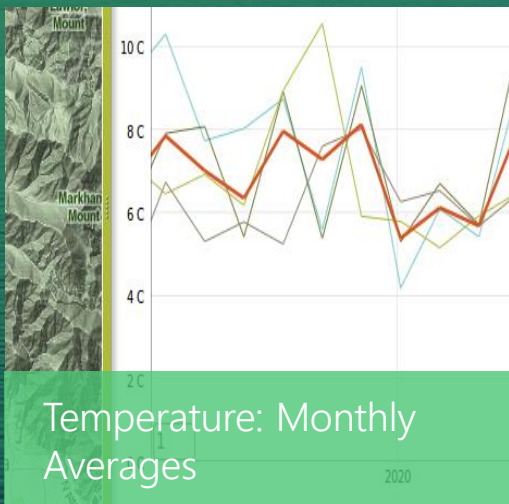
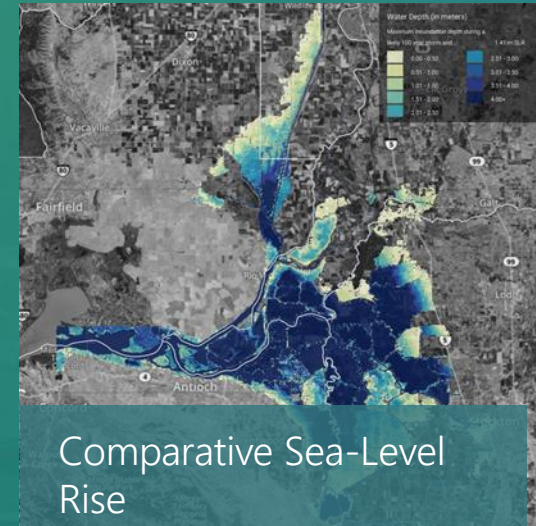
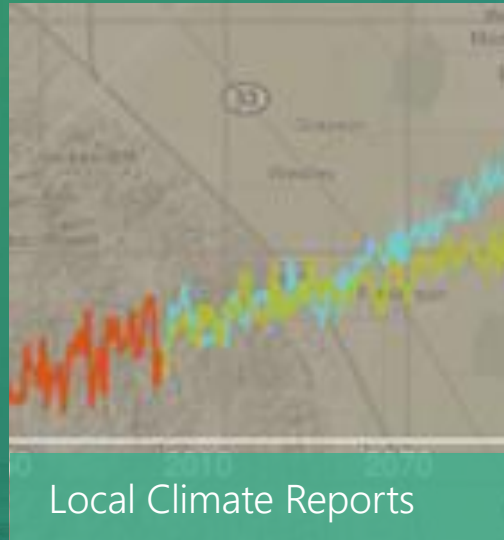


# Enhanced Wildfire Tool

- New wildfire data layers from UC Merced will be included on Cal-Adapt when ready:
  - Fire severity
  - Emissions
- Develop visualization for exploring extreme wildfire years
- What additional features would make the wildfire tool more useful?
  - Monthly and/or seasonal averages in addition to annual averages?



# We Need Your Input!



# Quarterly Public Webinars

Beta Test our new [Extreme Precipitation Tool](#)!

Thursday, March 28, 2019 from 12:30-1:30 pm

*WebEx info can be found at [Cal-Adapt.org](http://Cal-Adapt.org)*

An extreme weather event is an occurrence that is significantly different from typical weather at a specific location and time of year. Infrastructure and systems that are designed to be resilient to historical extremes may not be prepared for the extreme events associated with a changing climate.

The new Cal-Adapt Extreme Precipitation tool allows users to investigate what extreme events are projected to look like in the future by providing simple measurements of the intensity and frequency of events of different durations for the historical and future climate scenarios.



# Thank you

Questions? We welcome your feedback.

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Twitter: @cal\_adapt

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